FAIRFAX COUNTY

DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL SERVICES

Office of Site Development Services
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V I R G I N I A

October 1, 2001 01-09

To: All Architects, Builders, Developers, Engineers and Surveyors Practicing in Fairfax County

Subject: Clarification of Geotechnical Report and Related Site Plan Requirements

In recognition of numerous questions that often arise during the preparation of plans for submission to the County, the purpose of this letter is to clarify soil related questions.

WHEN GEOTECHNICAL REPORTS ARE REQUIRED FOR SUBMISSION

Although it is advisable to perform geotechnical investigations for all development projects, the County does not require the submission of all geotechnical reports for review and approval. In compliance with Article 107 of *The Code of the County of Fairfax, Virginia* (County Code) the submission of geotechnical reports is required for construction activities in Problem Soils. Problem Soils are defined as Class "A" and Class "B" soils and are described in the publication titled *"Ratings of Soils for Urban Development in Fairfax County"*, which was updated in February 2001. Copies may be obtained at the Plan and Document Control and the Permits Counters or the County's Publications Office or website.

For sites with Class "A" soils, geotechnical reports are required for submission; however, in accordance with Article 107-1-5 of the County Code, waivers may be granted for construction in Class "A" soils provided that there is adequate information on the condition of the soil. Such situations rarely exist without a supporting geotechnical investigation. Waivers are usually not granted for occupied buildings that are constructed in Class "A" soils. Waivers are usually granted in situations where the structure proposed for construction is uninhabitable or covered under other regulations, and it is determined that construction in problem soils would have a negligible impact on the structure or adjoining properties. Examples include equipment buildings, communication towers, roads, trails, and utility lines, etc. Requests for waivers require a letter of justification accompanied by grading plans and the applicable waiver fees, and are submitted to Plan and Document Control.

Soil report exemptions may be granted in accordance with Article 107-1-2 when it is determined that "problem soils are not located adjacent to or within the construction area." The condition applies where the limits of grading and construction are confined to Class "C" (non-problem) soils existing on the property or for ease of interpretation, at least twenty-five feet away from Class "A" soils. The twenty-five feet distance allows for errors in mapping and drafting of the

soil map. Other factors usually considered include, but are not limited to, site grades, type of structure and history of problems on the property or adjoining properties. Requests for an exemption should consist of a letter of justification accompanied by the grading plans or construction plans. The package should be submitted through the Plan and Document Control Division. There are no applicable fees.

For Class "B" soils, the issues can usually be addressed directly on the plans without a waiver or exemption request. If the site, subdivision, grading or building plans address the geotechnical issues, a geotechnical or soil report submission is not necessary. The plans should include drawings and construction or geotechnical notes addressing the anticipated issues. Examples include, but are not limited to: a foundation drainage detail which complies with the building codes, and compacted fill specifications such as type of material, lift thickness, density and frequency of testing. In addition, construction inspection notes as shown in Sections 4-0402.1 and 4-0402.2 of the Fairfax County Public Facilities Manual (PFM) should be shown on the plans.

For sites or lots containing only Class "C" non-problem soils, there are no requirements for report submission; however, construction or geotechnical notes should be provided on the plans to address fill placement and compaction. Drawings for foundation drainage are advisable but are not required.

Development on sites with unmapped soils will require a soil map prepared by a registered professional to determine the need for a geotechnical report. It is preferred that the soil map be prepared by a Soil Scientist or Engineer with experience in the field of soil mapping. Practicing engineers are advised that this is a specialized field and it is expected that only those with specific experience in this field will prepare and certify soil maps. In the absence of a soil map, a geotechnical report with an adequate number of borings must be submitted. Boring logs will be required on final site plans with appropriate page reference on the cover sheet of the site or subdivision plan, to the sheet(s) within the plans showing the logs. A separate soil map is not required when a geotechnical report with boring logs is available.

Other situations where the submission of a geotechnical report may be required in accordance with Article 107-1-1 of the County Code or Section 1802.1 of BOCA National Building Code and Section 1802.1 of the International Building Code (IBC) or Section 6 of the PFM are described below:

- Sites that have been altered as a result of placement of uncontrolled, illegal or undocumented fill or existing landfills. Sites with these soil conditions are considered to contain Class "A" soils. Reference BOCA 1802.1 and IBC 1802.1

- Structures over three stories or 40 feet in height or structures incorporating mat foundations or any type of deep foundation. Reference BOCA National Building Code Section 1804.1.

- Stormwater Management Facilities with Dam Categories "A" or "B"

- Retaining Walls as clarified in the attached checklist. A separate report submission through Plan and Document Control is not required as part of the permit application package.

GEOTECHNICAL REQUIREMENTS ON CONSTRUCTION PLANS

In recent months, several clarifications have been sought over the intent of Article 4-0301.1 of the PFM. This article requires that geotechnical recommendations be incorporated into construction plans as "requirements." Geotechnical requirements are considered construction requirements; therefore, the language used on the construction plans must reflect this status. For example, an improperly worded statement on a site plan may read; "Footings may be placed at a depth of 2.5 feet for frost protection." In order to be enforceable on the site plan, such statements should read "footings shall be placed at a depth of 2.5 feet for frost protection." The title of a plan sheet (e.g. "Geotechnical Requirements") is not considered sufficient to convert ambiguous language to enforceable language. All ambiguous terms like "should" or "may" must be changed to requirements such as "shall" or "will," etc. In practice, most geotechnical reports have a section where the engineer has used the appropriate language. In case the report does not provide such language, only the geotechnical engineer who is certifying the plans should make the necessary changes. Changes made to the geotechnical requirements by others than the certifying geotechnical engineer will not be accepted.

If you have any questions on any of the information included in this letter or on general geotechnical requirements, please contact Olawale A. Ayodeji or Bijan Sistani, Chief Geotechnical Engineers of the Environmental and Facilities Review Division at 703-324-1720.

Sincerely,

SIGNATURE ON ORIGINAL

Michelle A. Brickner, Director

MB/dah

Attachment: Retaining Wall Checklist

cc: Zofia A. Zager, Director, Office of Building Code Services, DPWES

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CHECKLIST FOR RETAINING WALL SUBMISSIONS

Published by Land Development Services - October 2001

1. Retaining walls measuring 2 feet and over in height require building permits.

   Definition: Height is defined as the exposed face of the wall and does not include the frost depth. For terraced or tiered walls, height is defined as the elevation difference from the exposed surface of the bottom wall to the top of the highest tier.

   Definition: Terraced or tiered walls are group of walls that have a horizontal separation less than or equal to the height of the immediate lower wall. A line connecting to the toe of the walls equals 45 degrees or more.

2. Retaining walls less than 2 feet in height do not require building permits provided that they are not supporting any surcharge.

   Definition: A surcharge is any load supported on soils within the 45-degree loading plane of the toe or stem bottom of the retaining wall. Loads that are supported by soils at the same elevation as the footing of the retaining walls are not considered surcharges.

3. Separate building permits are required for each retaining wall on any project with more than one wall. Terraced or tiered walls require only one permit for the maximum height of the wall as defined under (1).

4. Any retaining wall that requires a building permit shall be designed for structural/mechanical strength and geotechnical stability and shall be certified by a professional engineer; however, retaining walls designed in accordance with the Fairfax County Guide titled *"Retaining Walls: A Guide for Homeowners Constructing Retaining Walls"* do not require certification.

5. Two (2) copies of the grading and construction/structural plans shall be provided with the permit application form. The plans shall show the following:

   a. Wall elevations and multiple cross-sections of each retaining wall. The actual ground slope at the top and the toe of the retaining wall shall be shown.

   b. Method of drainage behind the wall.

   c. Guardrail location and details for retaining wall systems 4 feet and higher, to protect pedestrian traffic when applicable.

   d. Specifications for the construction materials.

e. Specifications for the backfill material and compaction requirements.

f. Structural details of the retaining wall.

g. Bearing capacity of the foundation soil.

h. Sequence of construction of the retaining wall.

6. Two copies of sealed retaining wall design calculations demonstrating the structural/mechanical and geotechnical stability shall be submitted with a permit application package. Calculations shall address the effect of any surcharges on the wall. The following minimum factors of safety shall be met:

   a. Sliding = 1.5
      Overturning = 2.0
      Global = 1.5 for assumed soil parameters
      Global = 1.25 for laboratory determined soil parameters

   b. Global Stability Analysis performed by a geotechnical engineer is required under the following circumstances:

      - Retaining walls with backslope steeper than 4H:1V and on unstable (landslide prone) soils as identified on Fairfax County Soil Maps. The soil types are: 49-Lunt, 61-Loamy/Gravelly Sediments, 64-Silty/Clayey Sediments, 118-Marine Clay, 149-Lunt. This requirement does not apply to landscaping walls.

      - Retaining walls with backslope steeper than 2H:1V and height over 6 feet.

      - Retaining walls over 10 feet in height regardless of backslope.

      The geotechnical review of the stability analysis will be referred to the Environmental and Facilities Review Division (EFRD) if it was not previously addressed in an approved geotechnical (soils) report.

7. All walls 10 feet in height and over shall be referred to the Special Inspections Program regardless of location, i.e. residential or non-residential.

8. All below grade earth retaining structures, such as slope stabilizing piles, piers, caissons, sheeting and shoring structures require permits. The location spacing, depth, sizes of these structures shall be shown on the construction plans submitted with the building permit application. All below grade earth retaining structures shall be referred to the Special Inspection Program regardless of location.